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Description

The present invention relates to method and apparatus for generating signals from writing or drawing, the signals being dependent on the way in which the writing or drawing is carried out. The invention finds application particularly in signature verification and data capture.

German Specification DE-A-3143383 describes data entry using a pen which leaves a trail of ink when it is used to write on a surface. The pen also includes light sensing means having outputs which allow the direction of the trail to be sensed so allowing at least some of the content of information conveyed by the writing to be deduced. IBM Technical Disclosure Bulletin, Volume 27, No. 11, April 1985 discloses a cursor controller for a computer workstation in which the cursor position is controlled by the position of a probe on a pad. Two chromatic filters having gradients of transmission which are normal to one another are provided on the pad. The probe illuminates the pad and the transmission of light to a detector in the probe provides signals representative of the position of the probe, these signals being used to control the cursor position. In British Specification GB-A-1,280,388, a plate has a plurality of small holograms set in a matrix array, each hologram containing positional information specifying its position in the plate. By directing light from a movable coherent light source through the plate to a detector, the position of the light source across the plate can be detected from the positional information of any hologram illuminated.

Signature verification methods are known (UK Specification No. GB-A-1,480,066) in which the dynamic characteristics of signatures (characteristics obtained while the signature is being written) are used in signature verification.

Apparatus for identifying characteristics of handwriting by moving a pen across a ridged writing surface is described in US Patent Specification US-A-4,122,435 and similar apparatus for signature verification is described in US Patent Specification US-A-3,865,178. The same principle is used in the signature verifier described in the IBM Technical Disclosure Bulletin, Volume 18, No. 7, December 1976. A disadvantage of this method is the complexity of equipment required to sense the vibrations set up when the pen crosses a groove.

A known alternative which also suffers from the disadvantage of complexity is passing electrical signals into a grid of electrical conductors, the signals being representative in some way of the position of a conductor in the grid, and sensing signals using a pen whose position is to be determined. An example of such apparatus is described

in US Patent Specification US-A-4,580,830.

Other alternatives are described in European Patent Specification EP-A-0132241 where dynamic signatures are obtained by signing over a bar code using a light sensitive wand and European Patent Specification EP-A-0035038 where the direction of movement of a pen is determined from the output of light sensitive devices surrounding the tip of the pen.

Further alternatives are described in PCT Application No. WO-87/02804, and also in UK Specification No. GB-A-2 201 240 where a pen is used with lined paper and a temporal analysis of line crossings in writing a signature is carried out.

A way of entering data into computers is described in UK Specification GB-A-1,378,742 which depends on sequences of signals generated as a pointer used to enter graphical data crosses lines, which may be coloured, on a surface.

According to a first aspect of the present invention there is provided a method of obtaining information from writing or drawing, comprising the steps of

using the tip of a writing or drawing instrument to write or draw in relation to a surface, and

deriving an output signal from light reflected or transmitted by the surface at the point where the tip is currently located,

characterized by using as the surface, a surface which has shading which gradually varies in intensity or colour with position, deriving as the output signal, an output signal which is representative of the shading at the said point, and

obtaining at least part of the information content of the writing or drawing using the intensity or colour of the shading, as represented by the said output signal as a significant quantity representing the said information.

The shading may or may not be visible to the human eye, for example the shading may be in an ink which reflects ultra-violet light.

Where the shading is in intensity, the amount of light reflected or transmitted by the said surface may increase parallel to a straight line in the surface. For example where signature recognition is required the person signing may be required to sign in an area of a cheque, for example, which is shaded in intensity from top to bottom.

The first aspect of the invention may then also include the display of a graph of the magnitude of the said output signal versus time. Where the invention is used for signature verification the display can be compared with a similar display generated from stored signals representing an authentic signature. A main advantage of the invention is that an operator can compare both normal signatures and dynamic signatures shown on the display, making the task of a forger far more difficult.

As an alternative the output signal may be digitised and compared by a computer with values obtained from an authentic signature.

According to a second aspect of the present invention there is provided apparatus for signature verification comprising

a surface for writing which has shading which gradually varies in intensity or colour with position, and

sensing means for deriving an output signal from light reflected or transmitted by the surface at a point where the tip of a writing instrument is currently located as writing is carried out,

characterized in that the apparatus includes means for obtaining information as a signature is written on the surface, the means for obtaining information being arranged to use the intensity or colour of the shading, as represented by the said output signal as a significant quantity representing the said information, and the means for obtaining information including means for storing a representation of the output signal versus time when a genuine signature is written and for allowing comparison of the stored representation with a representation of the output signal versus time when a signature to be verified is written.

According to a third aspect of the present invention there is provided a method of obtaining information from writing or drawing, comprising

using a tip of a writing or drawing instrument to write or draw symbols in relation to a surface, and

deriving an output signal from light reflected or transmitted by the surface at a point where the tip is currently located,

characterized by using as the surface a surface which is divided into a plurality of areas each of which is divided into a number of regions and each region having shading with an intensity or colour which is different from that of all the other regions in that area,

deriving as the output signal, an output signal which is representative of the intensity or colour of the shading at the said point,

writing or drawing the symbols in respective ones of the areas with each symbol extending to several of the regions in that area,

detecting, from the output signal, a sequence of regions entered in writing or drawing each symbol, and

analysing the sequences obtained to indicate which symbols have been written or drawn.

Such a method of data entry is simple for an operator since a special purpose pen can be used to enter the data on printed stationery bearing areas divided up into the said regions.

Preferably the writing or drawing instrument of the various aspects of the invention leaves a line when it is used. The line may, for example, be

formed by ink or particles from a pencil, or a stylus may be used which, for example, releases material from the paper either on the upper surface or in a similar way to carbon paper.

The output signal representative of light reflected or transmitted by the surface may be generated in the ways described in PCT Application No. WO 87/02804, and in U.K. Specification No. GB-A-2 201 240. For this purpose the writing instrument may contain a light source or alternatively ambient light may be used to illuminate the surface. The writing or drawing instrument may, for example, sense light received at its tip and transmit a signal representative of the light intensity received to a computer, for instance by radio, ultrasonics or by means of a physical electrical connection.

Alternatively the surface may be transparent or translucent while carrying the said shading to modify the amount of light received dependent on position, and a light receiver may be positioned beneath the surface to generate the said output signal.

The writing or drawing instrument may be as described in U.K. Patent Application No. 8826411 and its PCT equivalent.

In this specification the word "reflection" includes both specular and scattering reflection and the word "light" includes visible, infra-red and ultra-violet light. Where ink or another writing medium appears when the writing instrument is used and the writing instrument contains light sensing means then, in almost all situations, the wavelengths of light transmitted or reflected by the marking on the surface must be different from those reflected or absorbed by the ink or other similar material.

Certain embodiments of the invention will now be described by way of example, with reference to the accompanying drawings, in which:-

Figure 1 illustrates in outline apparatus according to one embodiment of the invention,

Figure 2a shows part of a cheque embodying a feature of the invention

Figure 2b shows a display obtained in using one embodiment of the invention, and

Figure 3 illustrates a method of data capture according to the invention.

In Figure 1 a pen 10 is shown as though in use for signing a cheque 11. The pen is constructed to write and at the same time receive ambient light reflected from the point at which the tip of the pen makes contact with the surface on which writing is carried out. In addition the pen includes means for transmitting to a computer 12, for example by radio, a signal representative of the intensity of light currently received. Suitable pens are, as mentioned above described in UK Patent Applica-

tion No. 8828411 and the equivalent PCT application.

The signature is written on an area 13 of the cheque which is shown on a larger scale in Figure 2a and which has a background which varies in intensity from the top to the bottom of the area 13 as shown. A line 14 is provided to indicate where the signature should be written.

In the example of Figure 2a, as the down stroke 15 of the "j" of "John" is written, the light received by the pen 10 increases in intensity as indicated by the portion 15' of the graph of Figure 2b, where intensity of light received by the pen is plotted against time. As writing is continued, the remainder of the waveform of Figure 2b is developed until the final upstroke 16 of the "n" is represented by the part 16' of the waveform. Since operation depends on the pen sensing the intensity of shading in the area 13, light sensing means in the pen must respond to light of wavelengths other than those absorbed or reflected by the ink used by the pen.

The computer 12 is programmed to display the graph of Figure 2b. Preferably the computer is also programmed to display at the same time a similar graph based on stored values obtained from one or more previous signatures by the genuine signature owner. An operator checking a signature written in a bank or at a point of sale is then able to compare not only the signature itself with a version of the signature which may also be displayed by the computer but also the two waveforms. Clearly it is much more difficult for a forger to produce a forgery which is accurate both as an ordinary signature and as a dynamic signature displayed as a graph of pen tip position versus time.

Since variations in the shading of the area 13 occur in printing, it is advisable to include an area 17 shaded in the same way as the area 13. A person signing is then required, preferably before signing, to run the pen up or down the area 17 from one edge to the other. The resulting signal is then used by the computer 12 to calibrate the scale of the light intensity axis in Figure 2b.

The cheque 11 may of course be replaced by any document on which a signature is to be written and in particular the slips used when transactions are made using credit cards.

In an alternative the intensity of the background of the area 13 may increase from bottom to top or from left to right, although the latter is not so effective in producing a characteristic dynamic signature.

The light sensing means in the pen is likely to be able to distinguish several thousand shades of intensity. Thus if pieces of paper are printed with, for example, 2000 rectangles each of a different shading intensity unique thereto, the position of the

pen tip can be determined by the computer from the level of light received. For this purpose the computer must be loaded with information specifying where each intensity is on each piece of paper. The intensities may be set out in a logical order but it is not necessary that they are.

The signal received by the pen may be calibrated in the way mentioned above but as an alternative, or in addition, the pen or the computer may include means for sensing ambient light. The signal generated in this way can be used to allow for changing ambient light conditions.

Another way in which the invention can be used is for data capture. In Figure 3 part of a form 20 is shown which has areas 21 for data entry by means of a pen of the type mentioned in connection with Figure 1. Each area 21 is divided into a plurality of small rectangular regions 22 as shown in the enlargement 23 of one of the areas 21. Each small rectangle is shaded throughout to the same degree but the intensities of shading in the various rectangles are indicated by the numbers shown in Figure 3. For example the rectangle numbered 1 may have no shading while those numbered 2 to 16 have respective increases in the intensity of shading. As before the pen writes in an ink which has a colour which does not obscure the colour in which shading is carried out.

Using the numbers shown in Figure 3 to indicate intensity, entering the data character "2" shown in the left hand box 21 generates the following sequence as it is written: 5,2,3,7,11,10,14,15,16. In addition other intensities will be produced for short periods when the boundaries between regions are crossed but the computer 12 is programmed to omit from the sequence intensities which are between the discrete values obtainable when the pen tip is inside the various regions. As indicated by comparison for the sequence 1,2,3,4,7,11,10,14 for the number 7, each number and letter has a characteristic sequence. A problem may arise where a character is written in such a way that the pen passes directly over the border between adjacent rectangles; for example in writing the character "7" the first four numbers in the sequence would then be half derived from the sequence 5,6,7,8. For this reason persons using the method of data entry described are instructed to ensure that they write as far as possible on the small rectangles and not on the borders between them except when crossing the borders. Alternatively the size of the rectangles can be reduced to increase resolution when the problem is unlikely to occur because there is then more information available overall to the computer from which to determine a track taken by the pen tip.

As has been indicated above, the invention may be put into effect in many different ways than

those specifically described. For example a pen may be used which emits light from its tip, the light being received by a photosensitive device beneath the writing surface which is transparent or translucent. The "half tone" method may be used to provide the shading.

Though the invention may employ a pen to detect the various intensities of light transmitted from patterns printed on paper, it need not be so restricted. Any of the different patterns of light herein described may be effected by other means. For example, they may be projected onto plain paper, either from a light source beneath a surface supporting the paper when a surface which transmits light is employed, or else by illumination from above the paper. Alternatively the material on which the pattern is printed may be interposed between the light source and the surface, for example, or between the surface and the paper itself.

Although the embodiments specifically described utilise shading in one colour only, the shading may be replaced by different colours. For example in Figure 2a, the block 13 may change gradually between colours from top to bottom and/or from left to right, and in Figure 3 the numbers in the rectangles may represent different colours. The light receiver, in the pen, for example, is then sensitive to colours as well as light intensities. The shading in the block 13 may be in discrete bands whether of different constant intensities or intensities which vary along the length of the bands. The sequence in which the bands are set out in one direction need not be one of continual increase or decrease in intensity even to produce a signal of the general type shown in Figure 2b so long as the computer is loaded with information representing the sequence and can interpret the intensity of each band in terms of position.

Using different colours, the position of the pen over the whole area of the paper can be indicated. Where shading in one colour - say red - is graduated in intensity from the top to the bottom of the paper and superimposed by a different colour - say blue - graduated from left to right, an orthogonal coordinate system is provided.

To locate the pen position, a light sensitive device in the pen for example, samples that component of light reflected or transmitted by the first colour before going on to sample that component reflected or transmitted by the second colour. The light sensitive device responds to input from light of different spectra illuminating the paper in turn, say substantially red light succeeded by substantially blue light and so on. Signals derived from the red light provide information on the position of the pen along the vertical axis whilst those derived from the blue light determine the position relative to the horizontal axis.

Preferably the pen includes two light sources of different colours which are switched on alternately to illuminate the paper. The pen may have a body which is transparent when the light sources can be in a part of the pen which is remote from the tip but the body guides the light to the tip where it is emitted to illuminate the paper around the tip. The pen may be of the rollerball type but with a transparent ball at its tip and a light guide for transmitting light from the ball to the light sensitive device (as is described in the above mentioned UK Application No. 8628411). If so, the light path by way of the ball and the guide must be light-insulated from the coloured light sources and the transparent pen body. The light sensitive device may be sensitive to light of both colours when signals representing the two position coordinates are separated according to the time received in relation to the times at which the two colours illuminate the paper.

Alternatively the light sensitive device may have separate sections sensitive to light of different colours, respectively. For example each section may employ a filter corresponding to the colour it is to receive. With this arrangement the two light sources may provide constant illumination, not alternately one on and then the other or a single constant source may be used having a spectrum which includes both colours. Also, the two sections of the light sensitive device then remain in constant operation, not time multiplexed.

Claims

1. A method of obtaining information from writing or drawing, comprising the steps of
 - using the tip of a writing or drawing instrument (10) to write or draw in relation to a surface (13), and
 - deriving an output signal from light reflected or transmitted by the surface at the point where the tip is currently located, characterized by using as the surface, a surface which has shading which gradually varies in intensity or colour with position,
 - deriving as the output signal, an output signal which is representative of the shading at the said point, and
 - obtaining at least part of the information content of the writing or drawing using the intensity or colour of the shading, as represented by the said output signal as a significant quantity representing the said information.
2. A method according to Claim 1 characterized by using as the surface, a surface which has shading which continuously increases in intensity, or continuously changes colour, in a

linear direction in the said surface.

3. A method according to Claim 2 characterized by displaying a graph of the magnitude of the said output signal versus time.
4. A method according to any preceding claim for signature verification characterized by writing a signature which is to be verified on the surface using the writing instrument, and comparing a representation of the output signal versus time with a stored representation of the output signal versus time obtained when a genuine signature was written.
5. A method according to Claim 4 characterized in that the step of comparing representations of the output signal is carried out computationally.
6. A method of obtaining information from writing or drawing, comprising
 - using a tip of a writing or drawing instrument (10) to write or draw symbols in relation to a surface, and
 - deriving an output signal from light reflected or transmitted by the surface at a point where the tip is currently located,
 - characterized by using as the surface, a surface which is divided into a plurality of areas (21) each of which is divided into a number of regions (22) and each region having shading with an intensity or colour which is different from that of all the other regions in that area,
 - deriving as the output signal, an output signal which is representative of the intensity or colour of the shading at the said point,
 - writing or drawing the symbols in respective ones of the areas with each symbol extending to several of the regions in that area,
 - detecting, from the output signal, a sequence of regions entered in writing or drawing each symbol, and
 - analysing the sequences obtained to indicate which symbols have been written or drawn.
7. A method according to any preceding claim characterized in that
 - writing or drawing using the said tip causes a trail to be left which can be traced later.
8. A method according to any preceding claim characterized by including projecting light onto the surface to provide the shading in intensity

or colour.

9. Apparatus for signature verification comprising
 - a surface for writing which has shading which gradually varies in intensity or colour with position, and
 - sensing means for deriving an output signal from light reflected or transmitted by the surface at a point where the tip of a writing instrument (10) is currently located as writing is carried out,
 - characterized in that the apparatus includes
 - means (12) for obtaining information as a signature is written on the surface, the means for obtaining information being arranged to use the intensity or colour of the shading, as represented by the said output signal as a significant quantity representing the said information, and the means for obtaining information including means for storing a representation of the output signal versus time when a genuine signature is written and for allowing comparison of the stored representation with a representation of the output signal versus time when a signature to be verified is written.
10. Apparatus according to Claim 9 characterized by including means for projecting light onto the surface to provide the shading in intensity or colour.
11. Apparatus according to Claim 9 or 10 characterized in that the shading on the surface continuously increases in intensity or continuously changes colour in a linear direction in the said surface.
12. Apparatus according to any of Claims 9 to 11 characterized in that
 - the means for storing a representation and for allowing comparison comprises means for displaying a graph of the magnitude of the said output signal versus time.
13. Apparatus according to any of Claims 9 to 12 characterized in that the means for storing a representation and for allowing comparison comprises computational means (12) for comparing the said representation.
14. Apparatus for obtaining information from writing or drawing, comprising:
 - a surface for writing or drawing (20) which has shading which varies in intensity or colour with position, and
 - sensing means for deriving an output signal from light reflected or transmitted by the

surface at a point where a tip of a writing instrument is currently located in writing or drawing symbols,

characterized in that the surface (20) is divided into a number of areas (21), with each area divided into a plurality of regions (22) and each region having shading which is different in intensity or colour from that of all said other regions in that area,

the sensing means is so constructed that the said output signal is representative of the intensity or colour of the shading at the said point, and

the apparatus includes means (12) for detecting, from the output signal, a sequence of regions entered in each of the areas in writing or drawing each symbol, and for analysing the sequences obtained to indicate which symbols have been written or drawn.

16. Apparatus according to any of Claims 9 to 14 including

a writing or drawing instrument (10) which, when writing or drawing is carried out, causes a trail to be left which can be traced.

16. Apparatus according to Claim 15 characterized in that

the sensing means comprises light-sensing means contained in the writing or drawing instrument, and

the said instrument is arranged to dispense a marking material to form the said trail which reflects or absorbs light of different wavelengths to those transmitted or reflected by the shading on the said surface.

17. Apparatus according to any of Claims 9 to 18 wherein the means (12) for obtaining information is remote from the said instrument, and the apparatus includes

means for transmitting signals from the said instrument to the processing means.

18. Apparatus according to any of Claims 9 to 17, characterized in that

the surface is transparent or translucent,

the said instrument (10) contains a light source arranged to emit light through the said tip, and

the apparatus contains light sensing means positioned to receive light emitted from the instrument which passes through the said surface,

the said instrument being arranged to dispense a marking material to form the said trail which reflects or absorbs light of different wavelengths to those transmitted or reflected

by the shading on the said surface.

19. Apparatus according to any of Claims 9 to 18, characterized in that the surface has shading in two colours which varies in two directions.

20. Apparatus according to Claim 19 characterized by means for illuminating the surface at least adjacent to the said tip alternately with each of the two colours separately and means coupled to the sensing means for deriving two output signals, each output signal being derived while the surface is illuminated by a respective colour.

21. Apparatus according to Claim 19 characterized by means for illuminating the surface in at least the two colours, and in that the sensing means is constructed to derive two output signals, each representative of light of a different one of the colours but not the other colour.

Patentansprüche

- Verfahren zur Gewinnung von Information aus etwas Geschriebenem und/oder einer Zeichnung, mit den Schritten
einer Verwendung der Spitze eines Schreib- und/oder Zeichengeräts (10) zum Schreiben und/oder Zeichnen in bezug auf eine Fläche (13), und
Gewinnung eines Ausgangssignals aus durch die Fläche an dem Punkt, wo sich die Spitze laufend befindet, reflektiertem und/oder transmittiertem Licht,
dadurch gekennzeichnet,
daß als die Fläche eine Fläche verwendet wird, die eine mit der Position in der Intensität und/oder Farbe graduell varierende Tönung aufweist,
daß als das Ausgangssignal ein Ausgangssignal gewonnen wird, welches repräsentativ für die Tönung an dem Punkt ist, und daß wenigstens ein Teil des Informationsgehalts des Geschriebenen und/oder der Zeichnung erhalten wird, indem die Intensität und/oder Farbe der Tönung, wie sie durch das Ausgangssignal repräsentiert ist, als eine die Information darstellende signifikante Größe verwendet wird.
- Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
daß als die Fläche eine Fläche mit einer Tönung, die in einer linearen Richtung der Fläche kontinuierlich an Intensität zunimmt und/oder kontinuierlich die Farbe wechselt, verwendet

wird.

3. Verfahren nach Anspruch 2, gekennzeichnet durch eine Anzeige einer graphischen Darstellung der Größe des Ausgangssignals gegen die Zeit.
4. Verfahren nach einem der vorhergehenden Ansprüche zur Signaturverifikation, gekennzeichnet durch Schreiben einer zu verifizierenden Signatur auf der Fläche unter Verwendung des Schreibgeräts und Vergleichen einer Darstellung des Ausgangssignals gegen die Zeit mit einer gespeicherten Darstellung des Ausgangssignals gegen die Zeit, die beim Schreiben einer genuine Signatur erhalten wurde.
5. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß der Schritt des Vergleichens der Darstellungen des Ausgangssignals rechnerisch durchgeführt wird.
6. Verfahren zur Gewinnung von Information aus etwas Geschriebenem oder einer Zeichnung, mit einer Verwendung einer Spitze eines Schreib- und/oder Zeichengeräts (10) zum Schreiben und/oder Zeichnen von Symbolen in bezug auf eine Fläche, und einer Gewinnung eines Ausgangssignals aus durch die Fläche an einem Punkt, wo sich die Spitze laufend befindet, reflektiertem und/oder transmittiertem Licht, dadurch gekennzeichnet, daß als die Fläche eine Fläche verwendet wird, die in mehrere Gebiete (21) unterteilt ist, deren jedes in eine Zahl Bereiche (22) unterteilt ist, wobei jeder Bereich eine Tönung mit einer Intensität und/oder Farbe aufweist, die von der aller anderen Bereiche in diesem Gebiet verschieden ist, daß als das Ausgangssignal ein Ausgangssignal gewonnen wird, welches für die Intensität und/oder Farbe der Tönung an dem Punkt repräsentativ ist, daß die Symbole in jeweils zugeordnete Gebiete geschrieben oder gezeichnet werden, wobei sich jedes Symbol auf mehrere Bereiche in dem Gebiet erstreckt, daß aus dem Ausgangssignal eine Folge von Bereichen detektiert wird, in die beim Schreiben und/oder Zeichnen jedes Symbols geschrieben wird, und daß die erhaltenen Folgen analysiert werden, um anzuzeigen, welche Symbol geschrieben

und/oder gezeichnet worden sind.

7. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Schreiben und/oder Zeichnen unter Verwendung der Spitze bewirkt, daß eine Spur zurückbleibt, die später erkannt oder verfolgt werden kann.
8. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß auf die Fläche Licht projiziert wird, um die Tönung an Intensität und/oder Farbe bereitzustellen.
9. Vorrichtung zur Signaturverifikation, mit einer Fläche zum Schreiben, die eine Tönung, welche mit der Position in der Intensität und/oder Farbe graduell variiert, aufweist, und mit einer Abtasteinrichtung zur Gewinnung eines Ausgangssignals aus durch die Fläche an einem Punkt, wo sich die Spitze eines Schreibgeräts (10) beim Schreibvorgang laufend befindet, reflektiertem oder transmittiertem Licht, dadurch gekennzeichnet, daß die Vorrichtung eine Einrichtung (12) zur Gewinnung von Information beim Schreiben einer Signatur auf die Fläche aufweist, wobei die Einrichtung zur Gewinnung von Information derart ausgebildet und/oder angeordnet ist, daß sie die Intensität und/oder Farbe der Tönung, wie sie durch das Ausgangssignal repräsentiert sind/ist, als eine die Information repräsentierende signifikante Größe benutzt, und wobei die Einrichtung zur Gewinnung von Information eine Einrichtung zum Speichern einer Darstellung des Ausgangssignals gegen die Zeit beim Schreiben einer genuine Signatur und zum Ermöglichen eines Vergleichs der gespeicherten Darstellung mit einer Darstellung des Ausgangssignals gegen die Zeit beim Schreiben einer zu verifizierenden Signatur aufweist.
10. Vorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß eine Einrichtung zum Projizieren von Licht auf die Fläche zur Erzeugung der Tönung in Intensität und/oder Farbe vorgesehen ist.
11. Vorrichtung nach Anspruch 9 oder 10, dadurch gekennzeichnet, daß die Tönung auf der Fläche in einer linearen Richtung in der Fläche kontinuierlich an Intensität zunimmt und/oder kontinuierlich die

Farbe wechselt.

12. Vorrichtung nach einem der Ansprüche 9 bis 11, dadurch gekennzeichnet, daß die Einrichtung zum Speichern einer Darstellung und zur Ermöglichung eines Vergleichs eine Einrichtung zur Anzeige einer graphischen Darstellung der Größe des Ausgangssignals gegen die Zeit aufweist.
13. Vorrichtung nach einem der Ansprüche 9 bis 12, dadurch gekennzeichnet, daß die Einrichtung zum Speichern einer Darstellung und zur Ermöglichung eines Vergleichs eine Recheneinrichtung (12) zum automatischen Vergleich der Darstellung aufweist.
14. Vorrichtung zur Gewinnung von Information aus etwas Geschriebenem und/oder einer Zeichnung, mit einer Fläche (20) zum Schreiben und/oder Zeichnen, die eine Tönung, welche mit der Position in Intensität und/oder Farbe variiert, aufweist, und einer Abtasteinrichtung zur Gewinnung eines Ausgangssignals aus durch Fläche an einem Punkt, wo sich eine Spitze eines Schreibgeräts beim Schreiben oder Zeichnen von Symbolen laufend befindet, reflektiertem oder transmittiertem Licht, dadurch gekennzeichnet, daß die Fläche (20) in eine Zahl Gebiete (21) unterteilt ist, wobei jedes Gebiet in mehrere Bereiche (22) unterteilt ist und jeder Bereich eine Tönung aufweist, die in der Intensität und/oder Farbe von der aller anderen Bereiche in diesem Gebiet verschieden ist, daß die Abtasteinrichtung derart ausgebildet ist, daß das Ausgangssignal repräsentativ für die Intensität und/oder Farbe der Tönung an dem Punkt ist, und daß die Vorrichtung eine Einrichtung (12) zum Detektieren einer Folge Bereichen, in die beim Schreiben und/oder Zeichnen jedes Symbols in jedem der Gebiete geschrieben wird, aus dem Ausgangssignal und zum Analysieren der erhaltenen Folgen, um anzuzeigen, welche Symbole geschrieben und/oder gezeichnet worden sind, aufweist.
15. Vorrichtung nach einem der Ansprüche 9 bis 14, mit einem Schreib- und/oder Zeichengerät (10), welches beim Ausführen des Schreibens oder Zeichnens bewirkt, daß eine Spur hinterlassen wird, die erkannt oder verfolgt

werden kann.

16. Vorrichtung nach Anspruch 15, dadurch gekennzeichnet, daß die Abtasteinrichtung eine in dem Schreib- und/oder Zeichengerät enthaltene Lichtabtasteinrichtung aufweist, und daß das Gerät so ausgebildet ist, daß es ein Markierungsmaterial zur Bildung der Spur abgibt, welche Licht von Wellenlängen reflektiert und/oder absorbiert, die von denen verschieden sind, welche durch die Tönung auf der Fläche transmittiert oder reflektiert werden.
17. Vorrichtung nach einem der Ansprüche 9 bis 16, wobei die Einrichtung (12) zur Gewinnung von Information entfernt von dem Gerät angeordnet ist und die Vorrichtung eine Einrichtung zum Übertragen von Signalen von dem Gerät zu einer Verarbeitungseinrichtung aufweist.
18. Vorrichtung nach einem der Ansprüche 9 bis 17, dadurch gekennzeichnet, daß die Fläche transparent oder transluzent ist, das Gerät eine Lichtquelle zum emittieren von Licht durch die Spitze aufweist und die Vorrichtung eine Lichtabtasteinrichtung aufweist, die so angeordnet ist, daß sie von dem Gerät emittiertes Licht empfängt, das durch die Fläche hindurchgeht, wobei das Gerät so ausgebildet ist, daß es ein Markierungsmaterial abgibt, um die Spur zu bilden, welche Licht von Wellenlängen reflektiert und/oder absorbiert, die von denen verschieden sind, welche durch die Tönung auf der Fläche transmittiert und/oder reflektiert werden.
19. Vorrichtung nach einem der Ansprüche 9 bis 18, dadurch gekennzeichnet, daß die Fläche eine Tönung in zwei Farben aufweist, die in zwei Richtungen variiert.
20. Vorrichtung nach Anspruch 19, gekennzeichnet durch eine Einrichtung zum abwechselnden Beleuchten der Fläche separat mit jeder der zwei Farben wenigstens neben der Spitze und eine an die Abtasteinrichtung gekoppelte Einrichtung zur Gewinnung zweier Ausgangssignale, wobei jedes Ausgangssignal gewonnen wird, während die Fläche durch eine jeweilige Farbe beleuchtet wird.
21. Vorrichtung nach Anspruch 19, dadurch gekennzeichnet,

daß eine Einrichtung zum Beleuchten der Fläche mit wenigstens den zwei Farben vorgesehen ist und daß die Abtasteinrichtung so ausgebildet ist, daß sie zwei Ausgangssignale erzeugt, deren jedes für Licht einer der unterschiedlichen Farben, nicht aber für die andere Farbe repräsentativ ist.

Revendications

1. Une méthode d'obtention d'informations à partir d'écriture ou de dessin, comprenant les étapes suivantes :
 utilisation de la pointe d'un instrument d'écriture ou de dessin (10) pour écrire ou dessiner sur une surface (13), et
 dérivation d'un signal de sortie de la lumière réfléchie ou transmise par la surface au point où se trouve à ce moment la pointe, caractérisée par l'utilisation comme surface d'une surface présentant un ombrage dont l'intensité ou la couleur varie avec la position, dérivation comme signal de sortie d'un signal de sortie qui est représentatif de l'ombrage audit point, et
 obtention d'au moins une partie du contenu informationnel de l'écriture ou du dessin en utilisant l'intensité ou la couleur de l'ombrage, telle qu'elle est représentée par le signal de sortie sous la forme d'une quantité notable représentative des informations.
2. Une méthode selon la Revendication 1 caractérisée par l'utilisation comme surface d'une surface présentant un ombrage dont l'intensité augmente de façon continue, ou dont la couleur varie de façon continue, dans un sens linéaire sur la surface.
3. Une méthode selon la Revendication 2 caractérisée par
 l'affichage de l'amplitude du signal de sortie en fonction du temps.
4. Une méthode selon l'une des Revendications qui précèdent pour la vérification de signatures, caractérisée par l'apposition d'une signature à vérifier sur la surface au moyen de l'instrument d'écriture, et la comparaison d'une représentation du signal de sortie en fonction du temps à une représentation mémorisée du signal de sortie en fonction du temps obtenue lors de l'exécution d'une signature authentique.
5. Une méthode selon la Revendication 4 caractérisée en ce que l'étape de comparaison de représentations du signal de sortie est réalisée par ordinateur.
6. Une méthode d'obtention d'informations à partir d'écriture ou de dessin, comprenant
 l'utilisation d'une pointe d'un instrument d'écriture (10) pour écrire ou dessiner des symboles par rapport à une surface, et
 la dérivation d'un signal de sortie de la lumière réfléchie ou transmise par la surface en un point où se trouve à ce moment la pointe, caractérisée par l'utilisation comme surface d'une surface qui est divisée en une pluralité de zones (21) dont chacune est divisée en un certain nombre de régions (22), chacune des régions présentant un ombrage dont l'intensité ou la couleur diffère de celle de toutes les autres régions de cette zone, la dérivation comme signal de sortie d'un signal de sortie qui est représentatif de l'intensité ou de la couleur de l'ombrage à ce point, l'écriture ou le dessin des symboles dans les zones appropriées, chaque symbole s'étendant à plusieurs des régions de la zone, la détection, à partir du signal de sortie, d'une séquence de régions où chaque symbole a été écrit ou dessiné, et l'analyse des séquences obtenues pour indiquer les symboles qui ont été écrits ou dessinés.
7. Une méthode selon l'une des revendications qui précèdent caractérisée en ce que
 l'écriture ou le dessin exécuté au moyen de la pointe laisse une traînée qui peut être retrouvée ultérieurement.
8. Une méthode selon l'une des revendications qui précèdent caractérisée par l'inclusion d'une projection de lumière sur la surface pour produire l'ombrage en intensité ou en couleur.
9. Un appareil de vérification de signatures comprenant
 une surface d'écriture présentant un ombrage dont l'intensité ou la couleur varie progressivement avec la position, et
 un moyen de détection pour dériver un signal de sortie de la lumière réfléchie ou transmise par la surface en un point où est située la pointe d'un instrument d'écriture (10) pendant l'écriture, caractérisé en ce que l'appareil comprend un moyen (12) d'obtention d'informations pendant l'apposition d'une signature sur la surface, le moyen d'obtention d'informations étant disposé de façon à utiliser l'intensité ou la couleur de l'ombrage, telle qu'elle est représentée par le signal de sortie sous la forme

d'une quantité notable représentative des informations, et le moyen d'obtention d'informations comportant un moyen de mémorisation d'une représentation du signal de sortie en fonction du temps lorsqu'une signature authentique est rédigée et un moyen de comparaison de la représentation mémorisée à une représentation du signal de sortie en fonction du temps lors de l'apposition d'une signature à vérifier.

10. Un appareil selon la Revendication 9 caractérisé par l'inclusion d'un moyen de projection de lumière sur la surface pour produire l'ombrage en intensité ou en couleur.

11. Un appareil selon la Revendication 9 ou 10 caractérisé en ce que l'ombrage de la surface présente une augmentation d'intensité continue ou une variation de couleur continue dans un sens linéaire de la surface.

12. Un appareil selon l'une des Revendications 9 à 11 incluse caractérisé en ce que le moyen de mémorisation d'une représentation et de comparaison comprend un moyen d'affichage d'un graphique de l'amplitude du signal de sortie en fonction du temps.

13. Un appareil selon l'une des Revendications 9 à 12 incluse caractérisé en ce que le moyen de mémorisation d'une représentation et de comparaison comprend un moyen informatique (12) pour la comparaison automatique de la représentation.

14. Un appareil d'obtention d'informations à partir d'écriture ou de dessin, comprenant une surface d'écriture ou de dessin (20) présentant un ombrage dont l'intensité ou la couleur varie avec la position, et

un moyen de détection pour dériver un signal de sortie de la lumière réfléchie ou transmise par la surface en un point où est située une pointe d'un instrument d'écriture pendant l'exécution de symboles d'écriture ou de dessin.

caractérisé en ce que la surface (20) est divisée en un certain nombre de zones (21) dont chacune est divisée en une pluralité de régions (22), chacune de ces régions présentant un ombrage dont l'intensité ou la couleur diffère de celle de toutes les autres régions de cette zone,

le moyen de détection est exécuté de telle sorte que le signal de sortie est représentatif de l'intensité ou de la couleur de l'ombrage à ce point, et

l'appareil comprend un moyen (12) de détection, à partir du signal de sortie, d'une séquence de régions de chacune des zones où chaque symbole a été écrit ou dessiné, et d'analyse des séquences obtenues pour indiquer les symboles qui ont été écrits ou dessinés.

15. Un appareil selon l'une des Revendications 9 à 14 incluse comprenant un instrument d'écriture ou de dessin (10) qui, lors de l'exécution de l'écriture ou du dessin, laisse une traînée qui peut être retrouvée.

16. Un appareil selon la Revendication 15 caractérisé en ce que le moyen de détection comprend un moyen photosensible contenu dans l'instrument d'écriture ou de dessin, et l'instrument est disposé de façon à distribuer une matière marquante pour former la traînée qui reflète ou absorbe une lumière dont les longueurs d'onde sont différentes de celles transmises ou réfléchies par l'ombrage de la surface.

17. Un appareil selon l'une des Revendications 9 à 16 incluse où le moyen (12) d'obtention d'informations est éloigné de l'instrument, et l'appareil comprend un moyen de transmission de signaux de l'instrument au moyen de traitement.

18. Un appareil selon l'une des Revendications 9 à 17 incluse, caractérisé en ce que

la surface est transparente ou translucide, l'instrument (10) contient une source de lumière disposée de façon à émettre de la lumière par la pointe, et

l'appareil contient un moyen photosensible placé de façon à recevoir une lumière émise par l'instrument qui passe à travers la surface,

l'instrument étant disposé de façon à distribuer une matière marquante pour former la traînée qui reflète ou absorbe une lumière dont les longueurs d'onde sont différentes de celles transmises ou réfléchies par l'ombrage de la surface.

19. Un appareil selon l'une des Revendications 9 à 18 incluse, caractérisé en ce que la surface a un ombrage en deux couleurs qui varie dans deux sens.

20. Un appareil selon la Revendication 19 caractérisé par un moyen d'éclairage de la surface au moins adjacente à la pointe alternativement

dans chacune des deux couleurs séparées et un moyen couplé au moyen de détection pour dériver deux signaux de sortie, chacun des signaux de sortie étant dérivé pendant l'éclaireage de la surface par la couleur correspondante.

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21. Un appareil selon la Revendication 19 caractérisé par un moyen d'éclaireage de la surface dans au moins les deux couleurs, et en ce que le moyen de détection est réalisé de façon à dériver deux signaux de sortie, dont chacun est représentatif de la lumière d'une des couleurs différentes mais non de l'autre couleur

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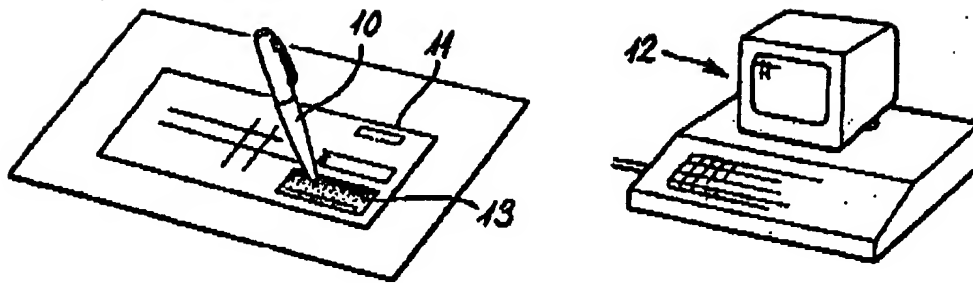


Fig. 1

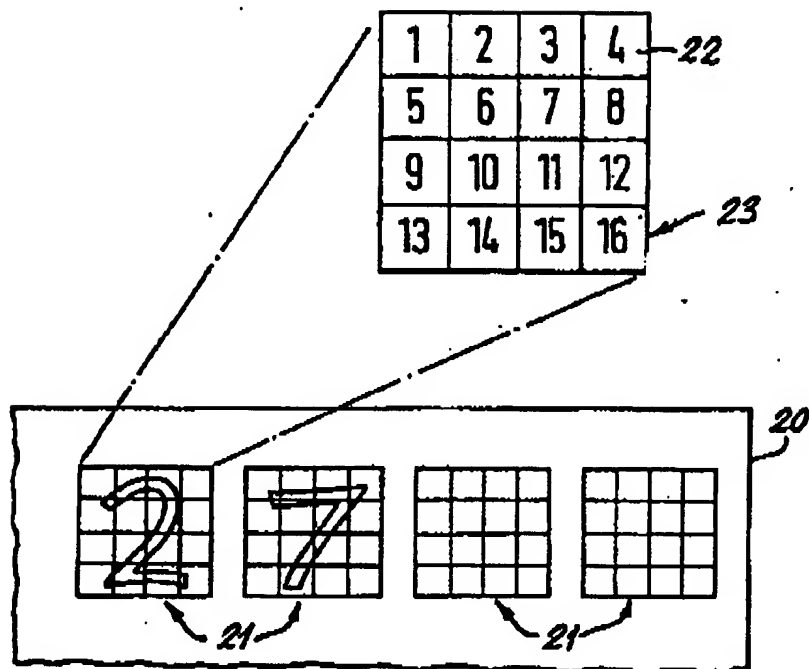


Fig. 3

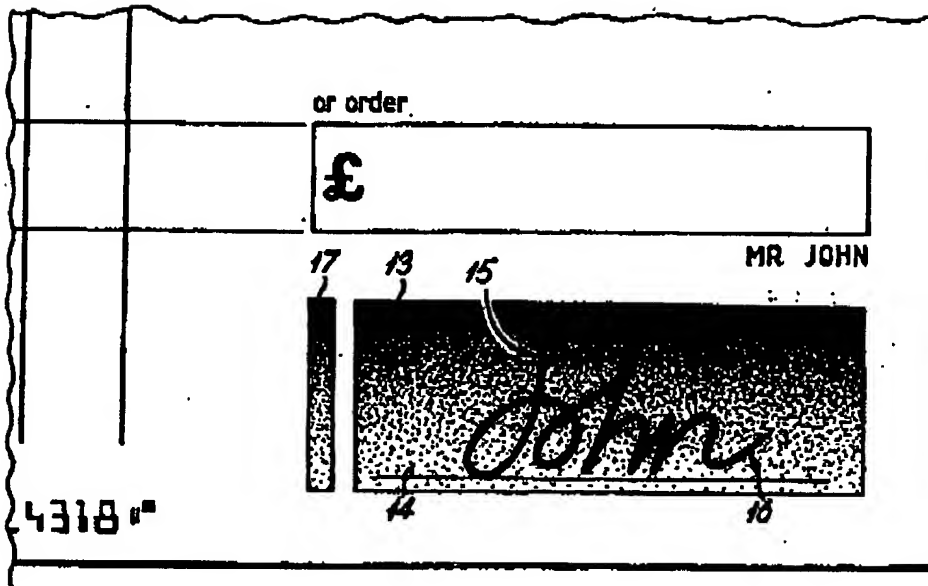


Fig. 2a

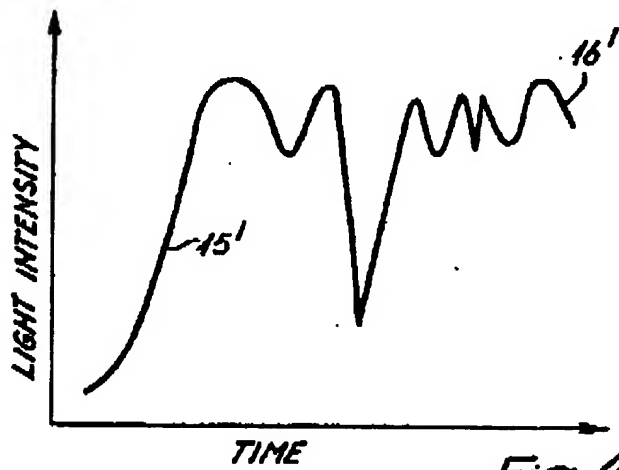


Fig. 2b